Draft Sampling Design for the Statewide Survey of Bioaccumulation on the California Coast

The Bioaccumulation Oversight Group

Products and Timeline

- BOG and Bight group complete planning discussions – Nov 14 ✓
- Write draft Sampling Plan – Dec 1
- Peer review – December 16
- Finalize Sampling Plan – January 2009
- Begin sampling – Spring 2009
- Year 1 data available – May 2010
- Draft technical report on year 1 – September 2010
- Final technical report on year 1 – January 2011

Management Questions for this Screening Study

1. Safe Consumption
   - For popular fish species, what percentage of popular fishing areas have low enough concentrations of contaminants that fish can be safely consumed?
2. Regional Distribution
   - What is the regional distribution of contaminant concentrations in fish?

Coordination

Coordinating efforts ✓

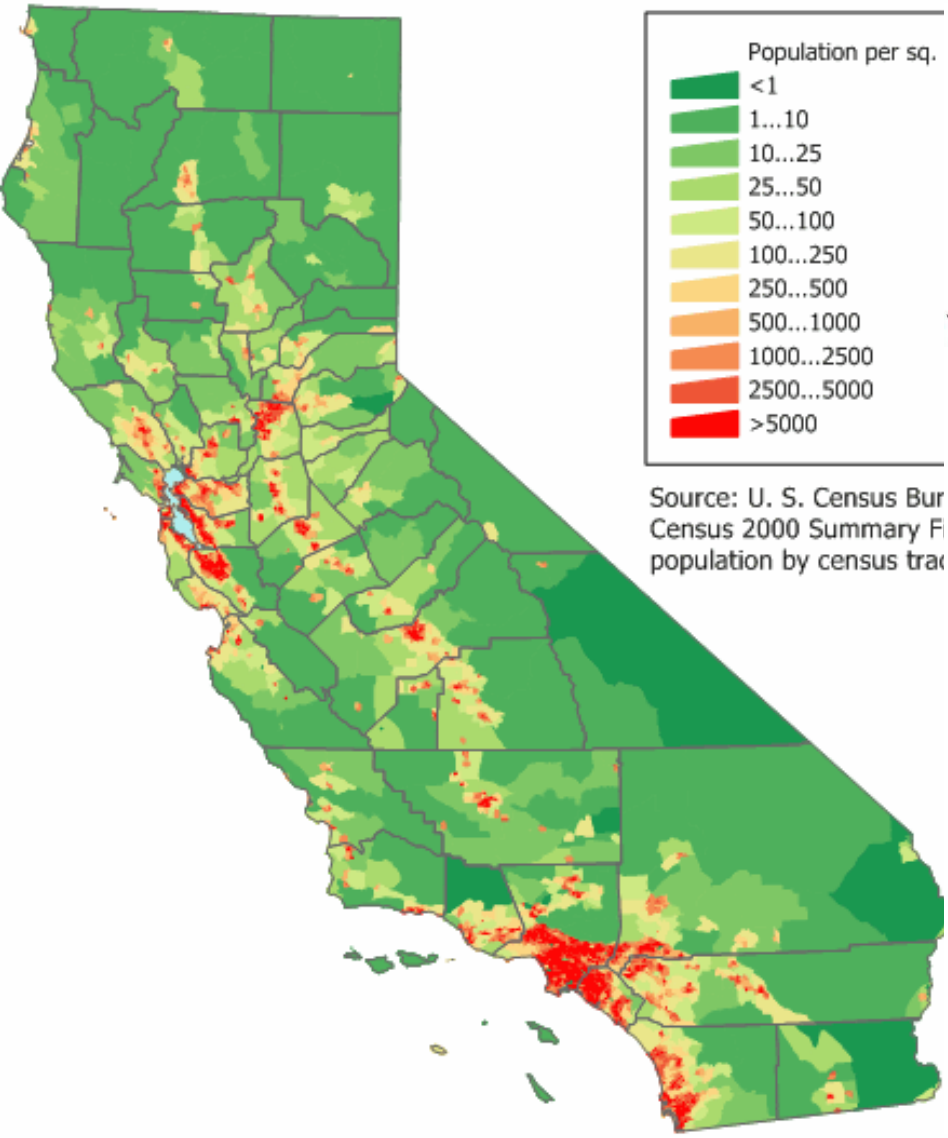
- Bight ’08 – contributing analysis of organics in 200 samples
- Region 4 will also augment
  - Possibly more species, zones
- RMP – covering San Francisco Bay with a similar approach, coordinating sampling and assessment

Benefits

- Overall more than $500K of matching funds
- Joint assessment across programs
- Multiple programs benefit from intercalibration

Strategy for Phased Approach

- Two-year study
- Proposed Phasing
  - Year 1: Regions 4, 8, 9 (So Cal Bight); Region 2
    - Coordination with Bight group, Region 4, RMP
    - WPCL involvement
      - SoCal contract work to Dave?
      - Region 4 SWAMP effort to Dave – how much?
      - Possibly split Bight sample analysis over two years


Population per sq.
<1
1...10
10...25
25...50
50...100
100...250
250...500
500...1000
1000...2500
2500...5000
>5000
Source: U. S. Census Bur
Census 2000 Summary F
population by census trac

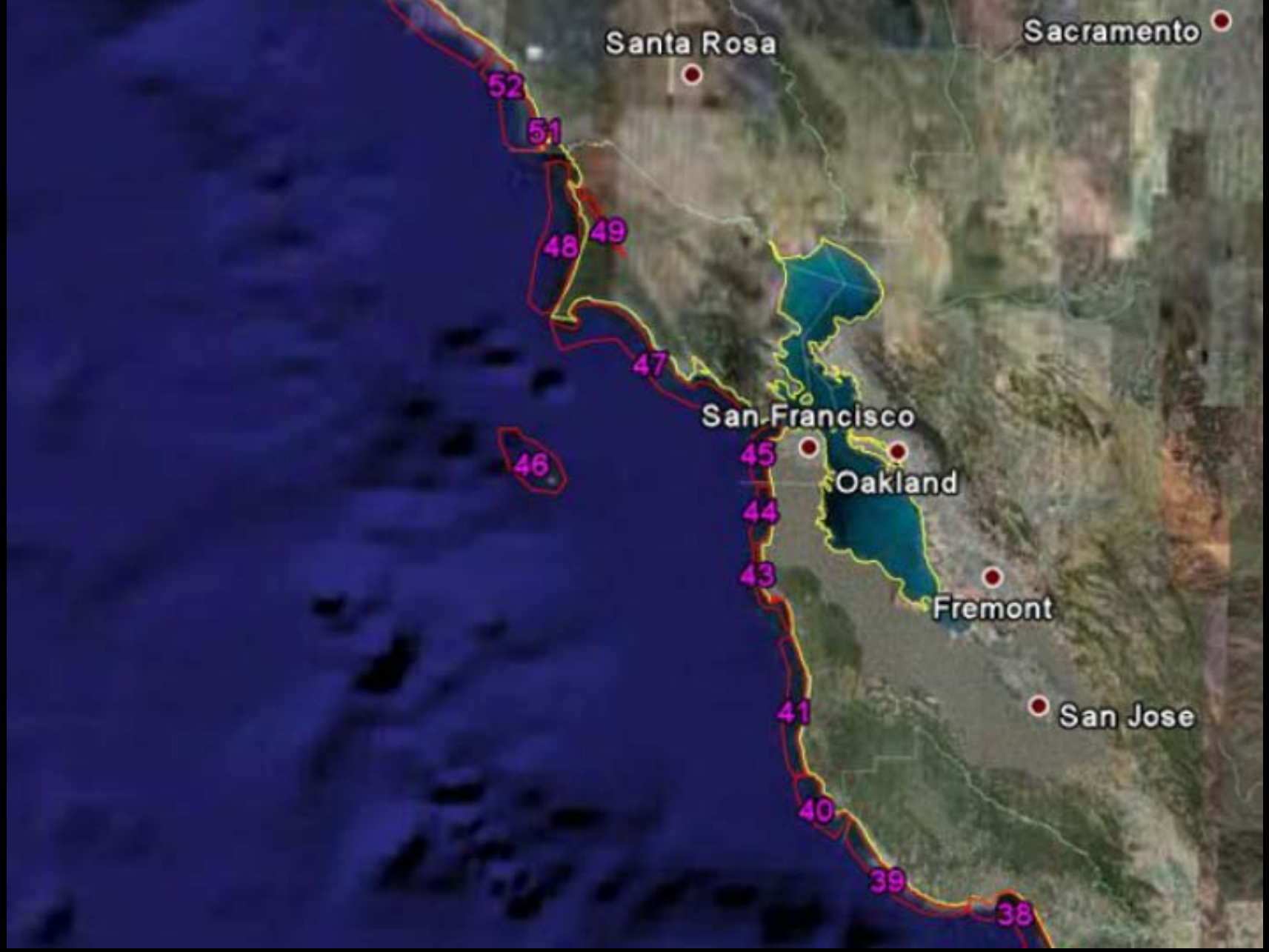

OREGON
NEVADA
ARIZONA
MEXICO
PACIFIC
OCEAN
REDDING
SACRAMENTO
FRESNO
1
2
3
4
5
6
7
8
9
DEL NORTE
SISKIYOU
MODOC
HUMBOLDT
TRINITY
SHASTA
LASSEN
TEHAMA
PLUMAS
GLENN
BUTTE
SIERRA
MENDOCINO
COLUSA
YUBA
NEVADA
LAKE
PLACER
SONOMA
YOLO
EL DORADO
NAPA
SOLANO
AMADOR
CALAVERAS
MARIN
CONTRA COSTA
SAN JOAQUIN
TUOLUMNE
SAN FRANCISCO
ALAMEDA
STANISLAUS
MARIPOSA
SAN MATEO
SANTA CLARA
MERCED
MADERA
SANTA CRUZ
SAN BENITO
FRESNO
TULARE
MONTEREY
KINGS
SAN LUIS OBISPO
KERN
SANTA BARBARA
VENTURA
LOS ANGELES
ORANGE
SAN BERNARDINO
RIVERSIDE
IMPERIAL
SAN DIEGO
INYO
MONO
ALPINE
Redding
Sacramento
Santa Rosa
Oakland
San Jose
Fresno
San Luis Obispo
Los Angeles
Victorville
Riverside
Palm Desert
San Diego
South Lake Tahoe
N

Spatial units: fishing zones

- Approach developed by SC Bight group
- ~ 70 for the state ✓
- Nearshore (includes bays and estuaries)
  - Zone width guidelines
    - Depth not to exceed 200 m (rule)
    - mainly 60 m and less (guidance)
- Considerations for delineating zones
  - Fishing pressure
  - Even distribution across coast
  - Homogeneity of land use, contamination
  - Stakeholder interest

Spatial units: fishing zones (continued)

- Need to cover whole coastline? Or sample key places and distinct, efficient plan for reference areas (i.e., Regions 1 and 3)?
  - Decision: same basic design, larger zones in less populated areas


Santa Rosa
Sacramento
52
51
49
48
47
San Francisco
46
45
Oakland
44
43
Fremont
41
San Jose
40
39
38

Target Species

- 5 per zone possible with “one replicate” plan
- Fish species that are (in order of priority): ✓
  1. Popular for consumption
  2. Sensitive indicators of problems – “bad boys” – for the different pollutants of concern – helps with evaluating safe consumption
  3. Widely distributed – spatial coverage and patterns
  4. Cleaner species
  5. Represent different exposure pathways (benthic vs pelagic)
- Guild approach for some taxa
  - Practical approach that allows spatial coverage
  - Need to demonstrate relationships? – beyond our means

Target Species

- Targets vary by region
- Primary targets and secondary targets
- Tiered approach?
  - Consider a strategy similar to the Lakes Survey where we analyze the bad boys first, then go further with other secondary target species if needed

Coast <3m	SoCal	CenCal	NorCal
Primary	Rockfish: Kelp Bass or Oli	Rockfish: Olive or Black R	Rockfish: Olive or Black Rockfish
			Lingcod
	White Croaker	White Croaker	
		Salmon	Salmon
	Chub Mackerel		
	Shark Species		
	Perch Species	Perch Species	Perch Species
		Top or Jacksmelt	
Secondary	Lingcod	Lingcod	
		Top or Jacksmelt	
	Alternate Rockfish	Alternate Rockfish	Alternate Rockfish
	Alternate Shark		
	Alternate Perch	Alternate Perch	Alternate Perch

Bays/ Harbors	SoCal	CenCal	NorCal
Primary	Perch: Black or Walleye or	Perch: Shiner or Black or W	Perch: Redtail or Walleye or Shiner
	Shark Species	Shark Species	Shark Species
	White Croaker	White Croaker	
	Top or Jacksmelt	Top or Jacksmelt	Top or Jacksmelt
	Flatfish	Flatfish	
		Rockfish	Rockfish
Secondary	Chub Mackerel		
			Lingcod
	Alternate Perch	Alternate Perch	Alternate Perch
	Alternate Shark	Alternate Shark	Alternate Shark
	Top or Jacksmelt	Top or Jacksmelt	Top or Jacksmelt

Southern California
Preliminary Species Selection

- Primary Target spp
  - Wt Croaker (benthic exposure)
  - Kelp Bass (water column exposure)
- Secondary Target spp.
  - Yellowfin croaker
  - Barred sand bass
  - Spotted sand bass
  - Olive rockfish
  - Sculpin
  - Mackerel

- Target 2 primary spp
- Retain all, but select at least one secondary spp per zone

Design Within Each zone

- Replication (within-zone variance estimates) ✓
  - 3 reps in SoCal, SF Bay
  - Maybe in other selected zones
    - Other enclosed bays and estuaries: one zone
  - Potential basis for advice (9 - 12 fish minimum for OEHHA)
  - Otherwise no reps in Central and North
    - Focus on covering more species
      - Better info for OEHHA, public
      - Better spatial coverage and comparisons

Design Within Each Zone (continued)

- Focus on areas within zone with highest fishing pressure ✓
- Opportunistic approach – obtain fish from easiest areas to get them

Sample Processing and Analysis

- Ancillary data ✓
  - Total length, fork length
  - Sex?
  - Location coordinates (what to store in database?)
  - Field observations (which ones?)
- Skin-off fillets
  - Including white croaker - need to discuss with RMP
- Exceptions
  - E.g., shiner surfperch [muscle+skin+skeleton]
- Intercalibration
  - Budget needed

Analytes in Tissue

- Mercury: generally composites, some individuals?
  - For bays and estuaries, consider picking mercury indicator species like lakes
  - Develop budget scenarios
- PCBs: sum of 55 congeners, skip Aroclors, no coplanars
- DDTs: sum of six isomers
- Dieldrin
- Chlordanes: sum of 5 compounds

Analytes in Tissue (continued)

- PBDEs: low cost approach (limited number of congeners that elute with PCBs), sum of xx congeners
- Ancillary parameters: lipid
- PFCs: SF Bay RMP special study
  - SCCWRP may also do some
  - Minnesota has a screening value
- Dioxins: SF Bay RMP special study
  - Increased interest in SF Bay – also more broadly across State?
  - Karen Taberski checking on priority and $
- Alternative flame retardants: SF Bay RMP special study
  - SCCWRP may also do some

Sampling Methods

- Trawling ✓
- Seining
- Spearfishing
- Hook and line

Target Size Ranges and Compositing for Each Species

- Composite to stretch dollars
- Use 75% rule
- Target middle of distribution that is caught and consumed
- Need to do homework to determine ranges
- Numbers in composites
  - Generally 5
  - 20 for surfperch

Ancillary water quality data

- None

Assessment thresholds

- Advisory Tissue Levels
- FCGs

Archiving

- Tiered approach
  - Long-term archives
  - Short-term archives

Budget

- Overall Project Budget

UNDER CONSTRUCTION

Budget

- Sampling and Analysis Budget Details

UNDER CONSTRUCTION